Remarks

In section 2 of the office action the Examiner rejects claims 23 and 39 under 35 USC §112 second paragraph as being indefinite for failing to particularly point out and to distinctly claim the subject matter which the Applicants regard as the invention. The Examiner remarks that the term "broadband" is a relative term which renders the claim indefinite. However, the Applicants respectfully disagree with this interpretation because "broadband" is a commonly used and well understood term by those of ordinary skill in the art as is supported by the extract attached from the Chambers Science and Technology Dictionary which describes "broadband" as a "description of signals, noise, interference, etc. which spreads over a wide range of frequencies". The Applicants therefore respectfully submit that the rejection of claims 23 and 39 under 35 USC §112 second paragraph cannot be sustained.

In section 4 of the office action the Examiner rejects independent claims 23 and 39 under 35 USC §102(b) as being anticipated by Lindemeier (US Patent No. 5,335,010). Reconsideration is requested.

In section 4 of the office action and also in the previous advisory action (mailed April 2, 2004) the Examiner argues that phase shifting a signal is equivalent to delaying it. The Applicants acknowledged in the previous response (filed April 26, 2004) that this is indeed true for a narrowband signal which is essentially at a single frequency but the Applicants respectfully submit that this is not the case for a broadband signal according to the definition given above. This can be clearly demonstrated in the following mathematical analysis:

For a single frequency, *f*, the phase delay ϕ corresponding to a given time delay τ is given by: $\phi = 360 \times f \times \tau$

For a broadband signal, with frequencies ranging from f to $f + \Delta$, the phase delay $\phi_{\min}$ for the lowest frequency *f* corresponding to the given time delay τ is given by:

$\phi_{min} = 360 \times f \times \tau$

whereas, the phase delay ϕ_{max} for the highest frequency $f + \Delta$ corresponding to the given time delay τ is given by:

$\phi_{max} = 360 \times (f + \Delta) \times \tau$

A given time delay therefore results in a different phase change for each of the constituent frequencies within the broadband signal.

As demonstrated above, there is no direct correlation between a time delay and a change in phase for the broadband signal because there is a wide range of frequencies within the signal and each frequency experiences a different phase change.

The Applicants therefore respectfully submit that a phase shift is not equivalent to "a delay element in at least one of said received paths" (this application, claim 23) because a phase shifter as described in Lindemeier and a delay element perform different operations when used on a broadband signal. Consequently the present invention as defined by claim 23 is clearly not anticipated by Lindemeier and the Applicants respectfully submit that the rejection of claim 23 under 35 USC §102(b) cannot be sustained.

The Examiner is also directed to the further arguments in the previous response filed on April 26, 2004 which are also applicable.

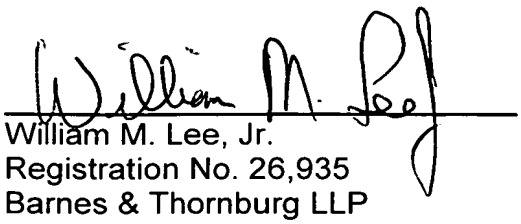
The above arguments in relation to claim 23 are also applicable to independent claim 39 and the Applicants respectfully submit that the rejection of claim 39 cannot also be sustained.

Detailed arguments are not presented in respect of the dependent claims however the arguments of the Examiner should not be taken to be accepted.

In view of the fact that all of the Examiner's comments have been addressed further and favorable consideration is respectfully requested.

August 25, 2004

Respectfully submitted,



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Bristol diamonds *(Min.)*. Small lustrous crystals of quartz i.e. rock crystal, occurring in the Bristol district.

Britannia metal *(Eng.)*. Alloy series of tin (80–90%) with antimony, copper, lead or zinc, or a mixture of these.

British Association (BA) screw thread *(Eng.)*. A system of symmetrical vee threads of 47½° included angle with rounded roots and crests. It is designated by numbers from 0 to 25, ranging from 6.0 mm to 0.25 mm in diameter and from 1 mm to 0.07 mm pitch. Used in instrument work, but now being superseded by standard metric sizes. Even numbers are preferred sizes.

British Columbian pine *(For.)*. See Douglas Fir.

British Standard brass (BSB) thread *(Eng.)*. A screw thread of Whitworth profile used for thin-walled tubing; it has 26 threads per inch for a given diameter. See **British Standard Whitworth thread**.

British Standard fine (BSF) thread *(Eng.)*. A screw-thread of Whitworth profile, but of finer pitch for a given diameter; largely used in automobile work.

British Standard Institution *(Govt.)*. A national organization for the preparation and issue of standard specifications.

British Standard pipe (BSP) thread *(Eng.)*. *British Standard gas thread*. A screw-thread of Whitworth profile, but designated by the bore of the pipe on which it is cut (e.g. ¾ in Gas) and not by the full diameter, which is a decimal one, slightly smaller than that of the pipe. See **British Standard Whitworth thread**.

British Standard specification *(Govt.)*. A specification of efficiency, grade, size etc. drawn up by the British Standards Institution, referenced so that the material required can be briefly described in a bill or schedule of quantities. The definitions are legally acceptable.

British Standard Whitworth (BSW) thread *(Eng.)*. The pre-metric British screw thread, still widely used in the US, having a profile angle of 55 degrees and a radius at root and crest of 0.1373 × pitch; 1/6th of the thread cut off. The pitch is standardized with respect to the diameter of the bar on which it is cut.

British Standard Wire Gauge *(Eng.)*. See **Standard Wire Gauge**.

British Thermal Unit *(Phys.)*. The amount of heat required to raise the temperature of 1 lb of water by 1 Fahrenheit degree (usually taken as 60°–61°F). Abbrev. *BTU*. Equivalent to 252 calories, 778.2 ft lbf, 1055 J. 10^5 Btu = 1 therm.

brittle fracture *(Eng.)*. Stress failure occurring suddenly in mild-steel vessels, thought to arise from coalescence of multiple dislocations at the boundaries of the component grains.

brittle micas *(Min.)*. A group of minerals (the clintonite and margarite group) resembling the true micas in crystallographic characters, but having the cleavage flakes less elastic. Chemically, they are distinguished by containing calcium as an essential constituent.

brittleness *(Eng.)*. The tendency to fracture without appreciable deformation and under low stress. It is indicated in tensile test by low ultimate tensile stress and very low elongation and reduction in area. The notched-bar test may, however, reveal brittleness in metals that give a high ultimate tensile stress. See **toughness**.

brittle silver ore *(Min.)*. A popular name for **stephanite**.

Brix *(Chem.Eng.)*. Scale of densities used in the sugar industry. Hydrometers are marked in 'degrees Brix', representing the density of a corresponding pure sugar solution in units equivalent to the percentage of sugar in the solution, either by volume ('volume Brix') of by mass ('mass Brix').

BRM *(Comp.)*. See **binary-rate-multiplier**.

broach *(Arch.)*. The sloping timber or masonry pyramid at the projecting corner of the square tower from which springs a *broach spire*.

broach *(Build.)*. The locating pin, within a lock, about which the barrel of the key passes.

broach *(Eng.)*. A metal-cutting tool for machining holes, often non-circular; it consists of a tapered shaft carrying transverse cutting edges, which is driven or pulled through the roughly finished hole.

broache work *(Build.)*. The finish given to a building-stone by dressing it with a punch so that broad diagonal grooves are left.

broach spire *(Arch.)*. An octagonal spire springing from a square tower without a parapet, and having the triangular corners of the tower covered over by short sloping pyramids blending into the spire.

broad *(Build.)*. A wood-turning tool, often consisting of a flat disk with sharpened edges fixed at right angles to a stem; used for shaping the insides and bottoms of cylinders.

broad *(Image Tech.)*. A studio light-source giving a wide angle of illumination.

broadband *(Telecomm.)*. (1) Said of a device (amplifier, mixer, transistor etc.) which is capable of operating with consistent efficiency over a wide range of frequencies. See **wideband amplifier**. (2) Used as a verb to imply the process of making a circuit or device operate over a wide range of frequencies. (3) Description of signals, noise, interference etc., which spreads over a wide range of frequencies.

bridge-base tower *(Elec.Eng.)*. A transmission-line tower with each leg separately anchored.

broad beam *(Radiol.)*. Said of a gamma- or X-ray beam when scattered radiation makes a significant contribution to the radiation intensity or dose rate at a point in the medium traversed by the beam.

broadcast channel *(Telecomm.)*. Any specified frequency band used for broadcasting; chosen with regard to freedom from mutual and other forms of interference, consistency of propagation and reception, intended range of broadcasting (i.e. local, international, satellite) and bandwidth of programme material (i.e. sound or vision).

broadcasting *(Telecomm.)*. The transmission of a programme of sound, vision, or facsimile for general reception.

broadcast standard *(Image Tech.)*. The highest quality of video recording and reproduction, suitable for international broadcast transmission, in contrast to the lower quality acceptable for domestic application.

broadcast transmitter *(Telecomm.)*. Radio transmitter designed with broadcasting as one of the primary design criteria.

broadcloth *(Textiles)*. A woollen cloth, woven from fine yarns in a twill weave, heavily milled, and finished with a dress face; originally made in dark colours for suitings but now available in pastel shades.

broadcloth, cotton *(Textiles)*. In US a light-weight poplin shirting fabric.

broad gauge *(Civ.Eng.)*. A railway gauge in excess of the standard 4 ft 8½ in. (1.435 m). In particular, the gauge of 7 ft (2.134 m) laid down by Brunel.

broad irrigation *(Build.)*. A process of sewage purification in which the effluent is distributed over a large area of carefully levelled land, and allowed to soak through it and drain away as ordinary subsoil water down the natural water-courses. Cf. **intermittent filtration**.

broadsheet *(Print.)*. (1) The sheet before it is folded. (2) In rotary printing, the size of newspapers printed consecutively around the cylinder.

broadside *(Print.)*. A large sheet printed on one side, such as a poster.

broadside antenna *(Telecomm.)*. Array in which the main direction of the reception or radiation of electromagnetic energy is normal to the line of radiating elements.

broad-spectrum *(Med.)*. See **wide spectrum**. Said of drugs.

Broadstone *(Build.)*. An ashlar.

broad tool *(Build.)*. A steel chisel having a cutting edge 3½ in (90 mm) in width, used for finish-dressing stone.

brocade *(Textiles)*. Jacquard designed dress or furnishing fabrics. The design is developed by floating the warp and/or weft threads in irregular order on a simple ground fabric.

Broca's area *(Med.)*. The left inferior convolution of the frontal lobe of the brain; the 'speech centre'.

brochanite *(Min.)*. A basic sulphate of copper occurring in green fibrous masses, or as incrustations; occurs in the oxidation zone of copper deposits.

brochur

brochure *(Print.)*. A b
work with its pages sti

Brockenspectre *(Meteo*

brockram *(Geol.)*. A se
Permian strata in N.V
blocks which probably

Brocot suspension *(h*
suspension in which a
pendulum can be made

brog *(Build.)*. An awl.

Broglie wavelength *(Ph*

broke *(Paper)*. Wet or
paper making or finishi
the mill.

broken colour *(Build.)*.
tive effects produced usi
manipulating them using
etc.

broken ends *(Textiles)*. Y
during weaving.

broken-over *(Print.)*. Th
plates or other separate
have been given a narrow
they will lie flat and turn

broken picks *(Textiles)*.
breaking of the weft.

broken-space saw *(Build.*
teeth to the inch with spac

broken twills *(Textiles)*.
line forming the *twill* is bro
direction, at intervals.

broken wind *(Vet.)*. A chro
horses; sometimes associ
pulmonary disease.

brom-cresol green *(Chem.*
tion of pH values, suitable

brom-cresol purple *(Chem*
nation of pH values within

Bromeliaceae *(Bot.)*. Fam
cotyledonous flowering
mcliniidae). Terrestrial and
(including tank epiphytes
tropical and subtropical An
The flowers often have sh
insect-pollinated. Includes
CAM crop-plant) and some

bromic acid *(Chem.)*. HB
bromosi (V). A powerful o

bromides *(Chem.)*. Salts o
bromide is extensively used

bromination *(Chem.)*. The
addition of bromine to orga

bromine *(Chem.)*. A nonme
group of the periodic sys
Symbol Br, at no. 35, r.a.m.
5, 7, mp −7.3°C, bp 58.8°
liquid, giving off a poison
irritating smell. In combinat
widely but sparingly distrib
source is sea water from whi
by treating the 'bittern' with
extensively in synthetic orga
knock additive to motor fuel,
quenched Geiger tubes.

bromochlorodifluoromethane
CIF_2. Bp −4°C. Organic
extinguishing fluid, particul
spaces. Low toxicity vapour,

bromoform *(Chem.)*. $CHBr_3$,
bp 151°C, rel.d. 2.9; a colo
odour. Much used in laborat
into *floats*, rel.d. less than 2.
2.9.

bromoil process *(Image Tech.)*
a bleached and tanned bromic
pigment which adheres to th
repelled by the highlights.